DETERMINATIONS OF WATER BODIES WITH PERENNIAL FLOW

CHESAPEAKE BAY • LOCAL ASSISTANCE DEPARTMENT •

CBPA Regulations 3/1/02

- Resource Protection Areas are comprised of "lands adjacent to water bodies with perennial flow that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts, which may result in significant degradation to the quality of state waters."

RPA Designation & Delineation 2-Stage Process

1. Provide map depicting general location of CBPAs (including RPAs).

2. Site-specific delineation of actual RPA boundaries when site plans are developed.

SNR Ad-hoc Committee

- Ad-hoc Committee of stakeholders
- Two meetings held (April/May 2003)
- Guidance Document: "Determinations of Water Bodies with Perennial Flow"
- Guidance Document: "Administrative Procedures for the Designation and Refinement of Chesapeake Bay Preservation Area Boundaries"

Generally Determining Whether Water Bodies Have Perennial Flow (9VAC 10-20-80D)

- One of following methods (provided method is adopted in local program/consistently applied):

1. Water bodies depicted as perennial on USGS maps
2. Use of scientifically valid system of in-field indicators of perennial flow

Site-specific Refinement of RPAs (9VAC 10-20-105)

- As part of plan of development review process (9VAC-10-20-231.1.e) or review of WQIA (9VAC-10-20-130.6) localities are required to ensure or confirm:

1. A reliable site-specific evaluation is conducted to determine whether water bodies on or adjacent to the development site have perennial flow, and
2. RPA boundaries are adjusted as necessary on the site based on this evaluation.

"Water Body With Perennial Flow"

A body of water that flows in a natural or man-made channel year-round during a year of normal precipitation. This includes, but is not limited to streams, estuaries, and tidal embayments and may include drainage ditches or channels constructed in wetlands or from former natural drainageways, which convey perennial flow. Lakes and ponds, through which a perennial stream flows, are a part of the perennial stream. Generally, the water table is located above the streambed for most of the year and groundwater is the primary source for stream flow.

Methods for Determining Perennial Flow

1. Field Indicator Protocols
2. Ground Water Monitoring
3. Surface Water Monitoring
4. Drainage Area Based on Sampling
5. Documented Observation

Field Indicator Protocols

Observations/evaluations of stream geomorphology, hydrology, & biology.

1. NC Div. Water Quality (Version 2, Jan.'00 and Draft Internal Policy 1/16/03). Scores ≥ 30 pts – stream assumed perennial.
2. Fairfax County Method (2003). Scores ≥ 25 pts – stream assumed perennial.

Field Indicator Protocols

- Field verification recommend when score is within 3 points of 30 (NC method) or 25 (Fairfax method) i.e., documentation of other supportive data.
- Localities may retest/refine the scoring and thresholds due to expected physiographic differences.
- Modifications should be reviewed/approved by CBLAD.
- OK for site-specific determinations, only for definitive map where all streams evaluated.

Field Protocol Elements: Geomorphology

- Riffle/pools
- Substrate texture
- Natural levees
- Sinuosity
- Floodplain
- Braided channels
- Alluvial deposits
- Bench/undercut
- Bed/bank
- $\geq 2^{nd}$ Order stream
- Head cut
- Grade control point
- Surrounding topo

Field Protocol Elements: Hydrology

- Groundwater (seeps, water table)
- Leaf litter presence
- Sediment/debris
- Wrack lines

- Water in channel > 48 hrs after rain
- Water in channel during dry weather
- Redoxy-morphic conditions in sides of channel/headcut

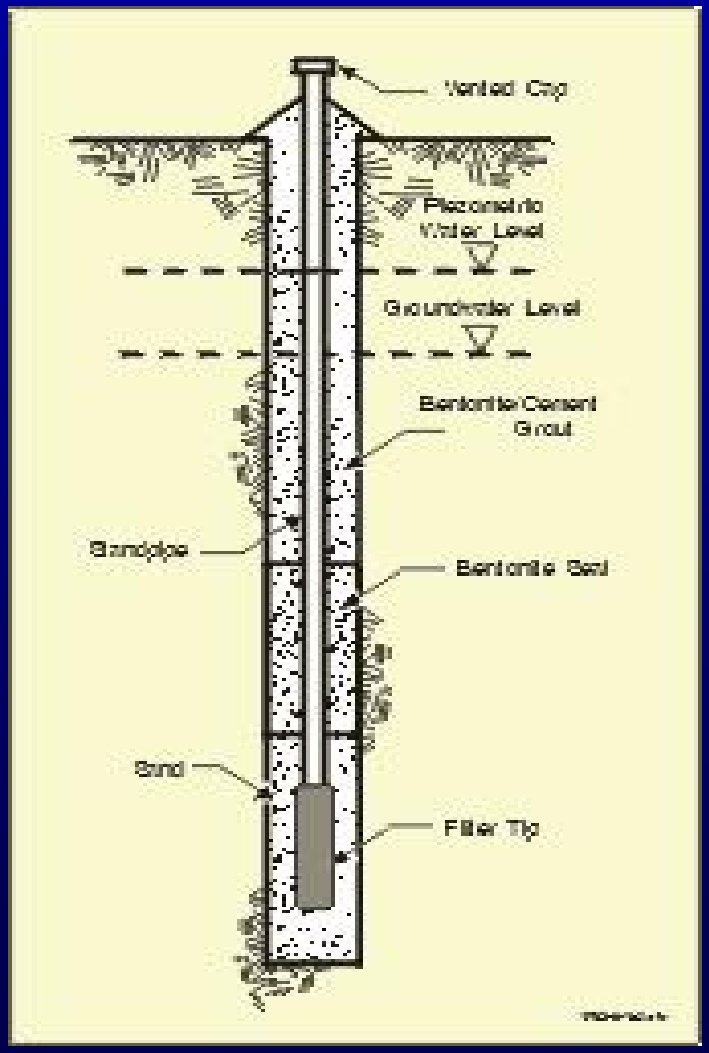
Field Protocol Elements: Biology

- Fibrous roots in streambed
- Aquatic or wetland plants
- Periphyton
- Bivalves
- Fish
- Aquatic turtles
- Crayfish
- Macrobenthos
- Amphibians
- Iron oxidizing bacteria/fungus
- Filamentous algae

Ground Water Monitoring

- Piezometers/Monitoring Wells can be used to determine depth of shallow water tables.
- Place 3-10 ft from channel, low point in riparian zone, min. 2/watercourse segment.
- Survey elevations of piezo/MW/streambed
- Periodic monitoring (esp. in drier months)
- Compare WT data to streambed elevation
- Interpret data in context of climate conditions
- OK for site-specific determinations, only for definitive map where all streams evaluated.

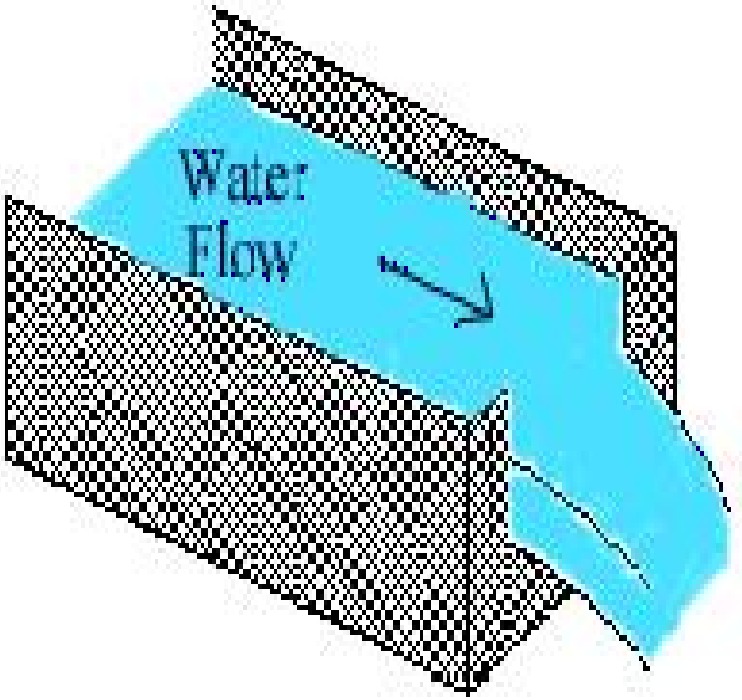
Piezometer Data

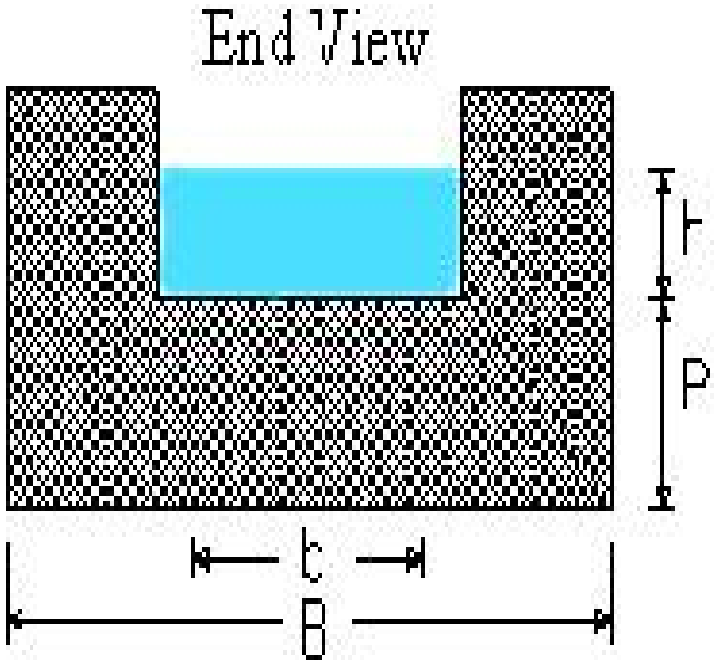


Surface Water Monitoring

- Stream flow can be determined by monitoring existing or new weir or flume.
- Calculate discharge using weir equations.
- Corroborate data with recent/seasonal climatic data and photographs of stream and impounding structure.
- Flow meters, collapsible flumes generally unacceptable.
- OK for site-specific determinations, only for definitive map where all streams evaluated.

Weir Measurements



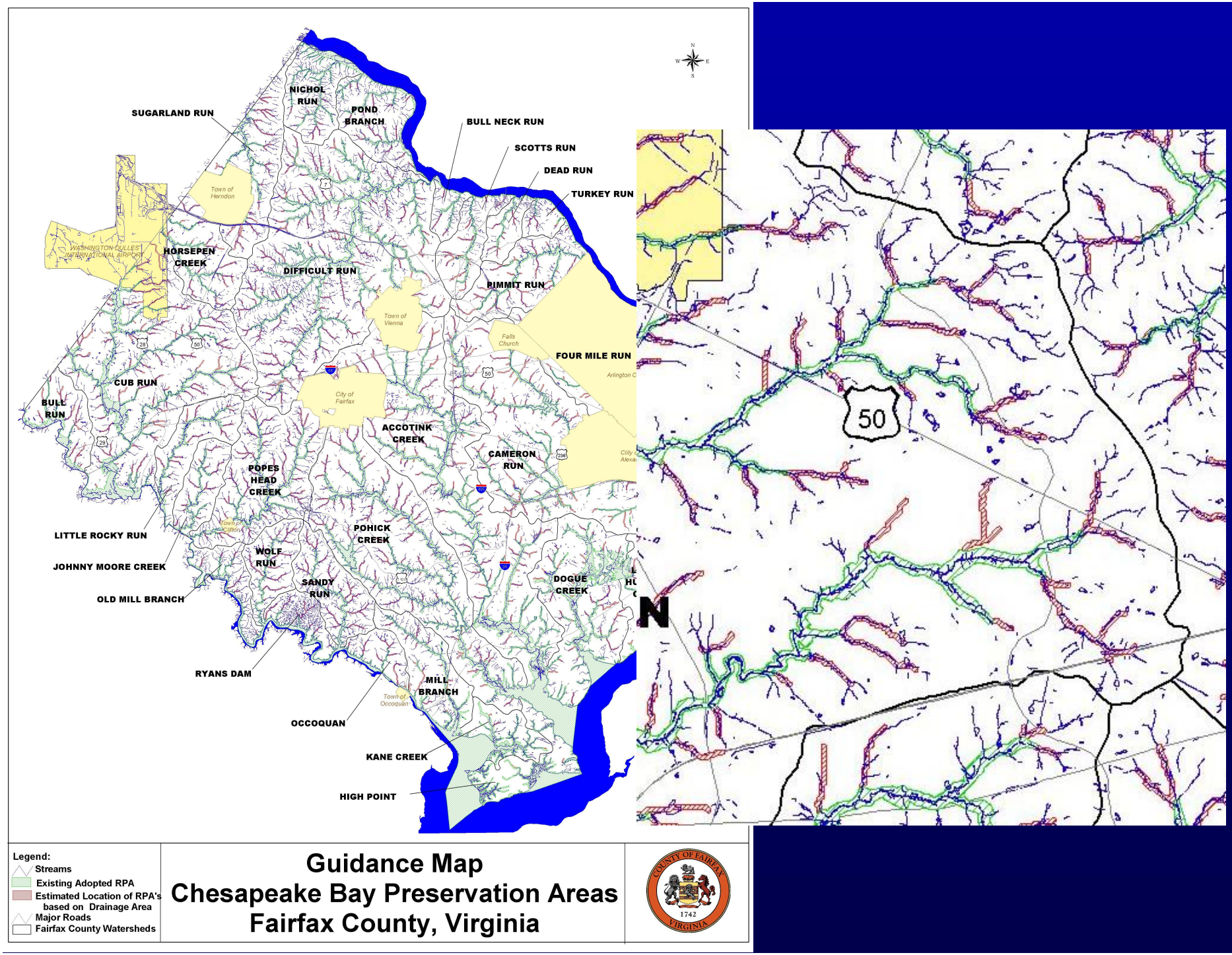


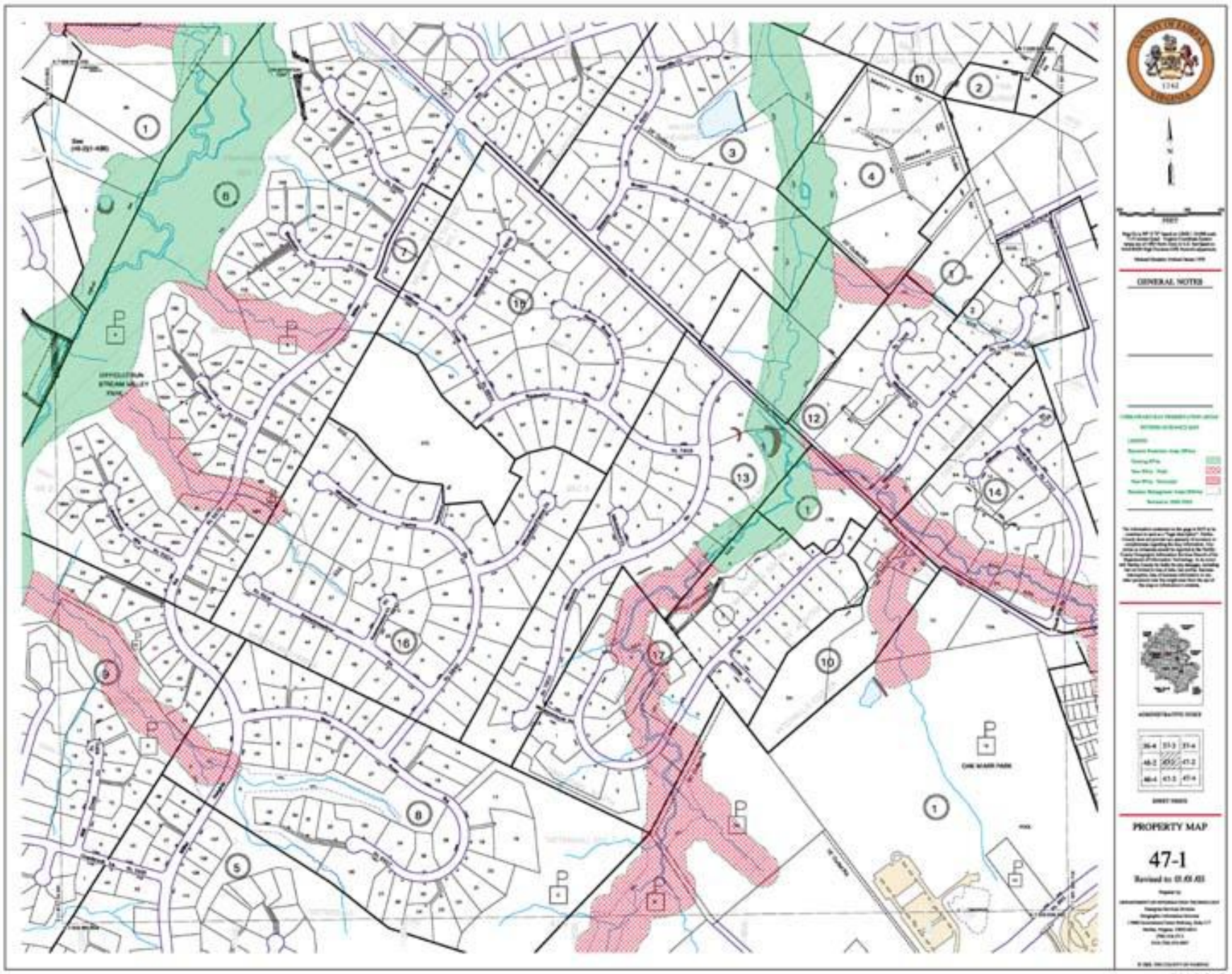
Drainage Area Based on Sampling

- Threshold watershed size based upon a statistically valid random sampling of stream flow in a particular watershed.
- Threshold watershed size acceptable in adjacent/nearby watersheds that share similar geologic/watershed characteristics.
- Subwatershed study area $\geq$ 5 sq. mi. or to lower end of 4^{th} order stream.
- At least 20 transition points (I/P, E/P)
- Resurvey at least 20% during dry season

Drainage Area Based on Sampling

- Would not definitively determine precise beginning of perennial flow (win some, lose some).
- Provides ease of use, predictability, consistency in application.
- OK for use in generally determining upstream extent of streams subject to RPA designation and depicting on general map (9VAC 10-20-80D).


NICHOL RUN
SUGARLAND RUN
POND BRANCH
BULL NECK RUN
SCOTTS RUN
DEAD RUN
TURKEY RUN
Town of Herndon
WASHINGTON DULLES INTERNATIONAL AIRPORT
HORSEPEN CREEK
DIFFICULT RUN
RIMMIT RUN
Town of Vienna
Falls Church
FOUR MILE RUN
CUB RUN
BULL RUN
City of Fairfax
ACCOTINK CREEK
CAMERON RUN
POPES HEAD CREEK
LITTLE ROCKY RUN
Town of Clifton
POHICK CREEK
WOLF RUN
JOHNNY MOORE CREEK
SANDY RUN
DOGUE CREEK
OLD MILL BRANCH
RYANS DAM
MILL BRANCH
Town of Occoquan
OCCOQUAN
KANE CREEK
HIGH POINT
50
N
Legend:
Streams
Existing Adopted RPA
Estimated Location of RPA's based on Drainage Area
Major Roads
Fairfax County Watersheds
Guidance Map
Chesapeake Bay Preservation Areas
Fairfax County, Virginia
COUNTY OF FAIRFAX
1742
VIRGINIA


GENERAL NOTES
PROPERTY MAP
47-1

Documented Observations

- Photodocumentation may be acceptable in certain circumstances.
- Accompanied by recent/seasonal climate data
- Photos should have date stamp/certification
- Minimum 2 photos clearly showing channel
- Upstream/downstream, 200 ft intervals
- Identifiable landmarks that can be verified
- Mark photo locations on map

Documented Observations

- Flow present during dry conditions (Palmer Index) strongly suggests perennial flow
- Dry channel during normal or wet conditions (Palmer Index) strongly suggests intermittent or ephemeral channel.
- OK for use as “reliable site-specific evaluation (9VAC 10-20-105) or as basis of definitive mapping (9VAC 10-20-80D)

Documented Observations

- Stream likely to be intermittent or ephemeral if:
  - Stream has no flow
  - Normal Rainfall Year/Month
  - Recent rainfall

Documented Observations

- Stream likely perennial if:
  - Stream has flow
  - Drought conditions exist
  - No recent rainfall

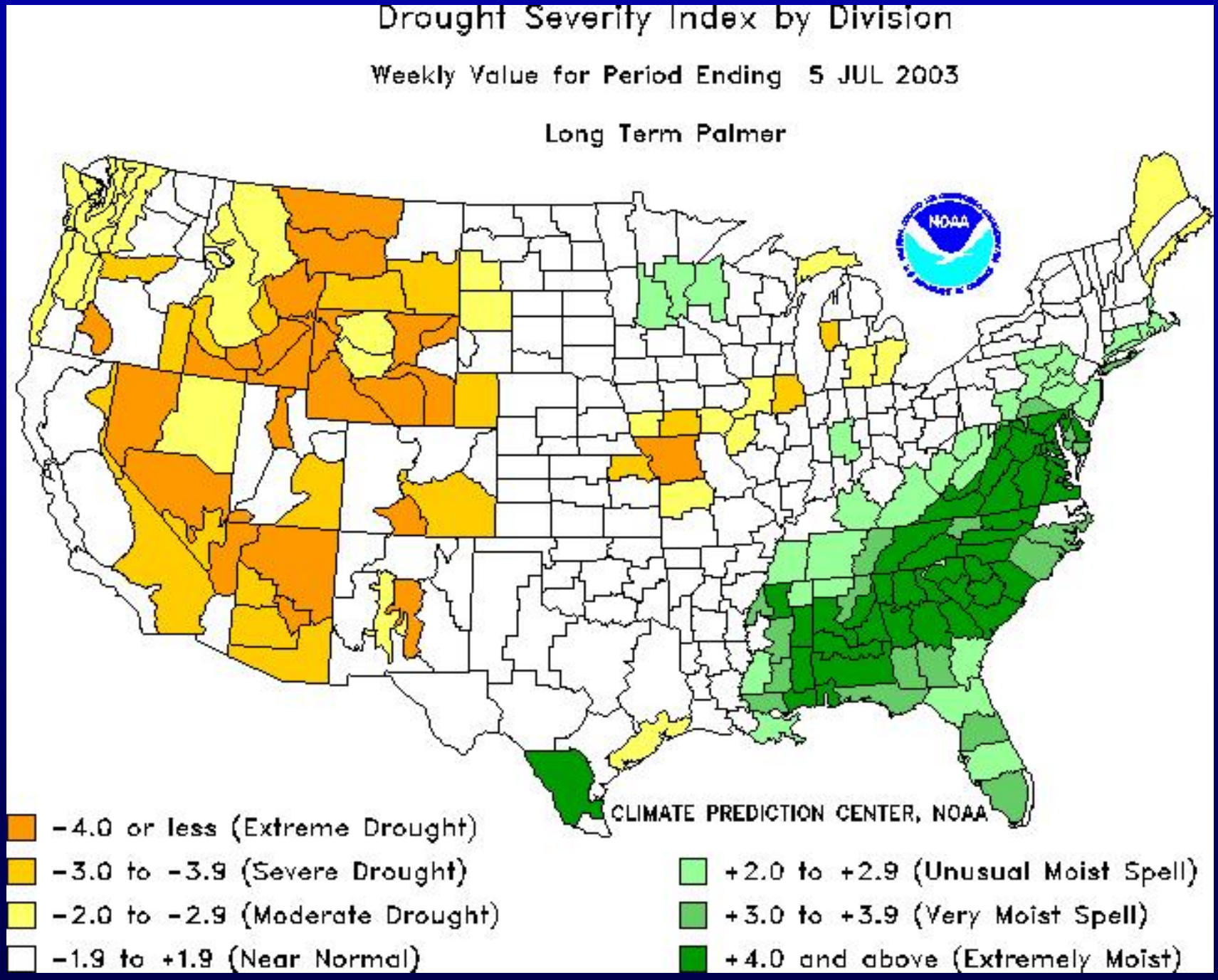
Corroborative Information

- Determinations should always be made in context of recent/seasonal weather conditions
- Preceding days, M-T-D, Y-T-D
- Deviations >20% normal (30-yr mean) precipitations are noteworthy (wet/dry)
- Look closely at biological indicators (fish, crayfish, amphibians, mussels/clams, large multi-year tadpoles/benthics)
- Anecdotal information (with caution!)

- Dulles Airport
  http://weather.noaa.gov/weather/current/KIAD.html
- Regan Nat'l Airport
  http://weather.noaa.gov/weather/current/KDCA.html
- VA State Climatology Office http://climate.virginia.edu/
- VA DEQ Drought Monitor
  http://www.deq.state.va.us/info/drought.html
- US Drought Monitor
  http://www.drought.unl.edu/dm/index.html
- Nat'l Weather Service
  http://205.156.54.206/er/lwx/index.htm
- Local Newspapers

Palmer (PDSI) Classifications

4.0 or more	Extremely wet
3.0 to 3.99	Very wet
2.0 to 2.99	Moderately wet
1.0 to 1.99	Slightly wet
0.5 to 0.99	Incipient wet spell
0.49 to -0.49	Near normal
-0.5 to -0.99	Incipient dry spell
-1.0 to -1.99	Mild drought
-2.0 to -2.99	Moderate drought
-3.0 to -3.99	Severe drought
-4.0 or less	Extreme drought

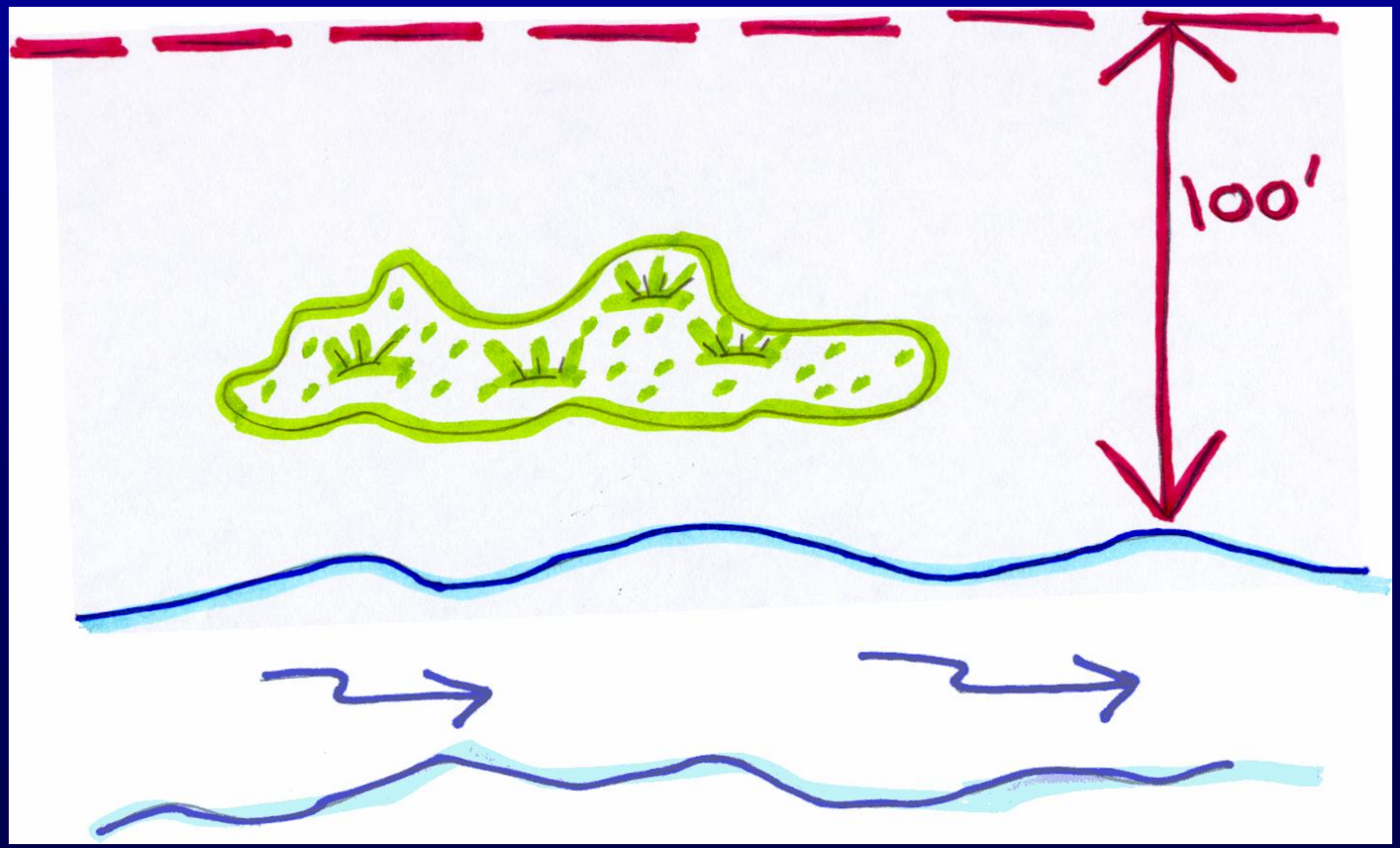

Drought Severity Index by Division
Weekly Value for Period Ending 5 JUL 2003
Long Term Palmer
NOAA
CLIMATE PREDICTION CENTER, NOAA
-4.0 or less (Extreme Drought)
-3.0 to -3.9 (Severe Drought)
-2.0 to -2.9 (Moderate Drought)
-1.9 to +1.9 (Near Normal)
+2.0 to +2.9 (Unusual Moist Spell)
+3.0 to +3.9 (Very Moist Spell)
+4.0 and above (Extremely Moist)

“Contiguous and Connected”

- “Contiguous” means touching a tidal wetland or water body with perennial flow.
- “Connected” by surface flow means through ground inundation by water or ground is saturated to the surface.

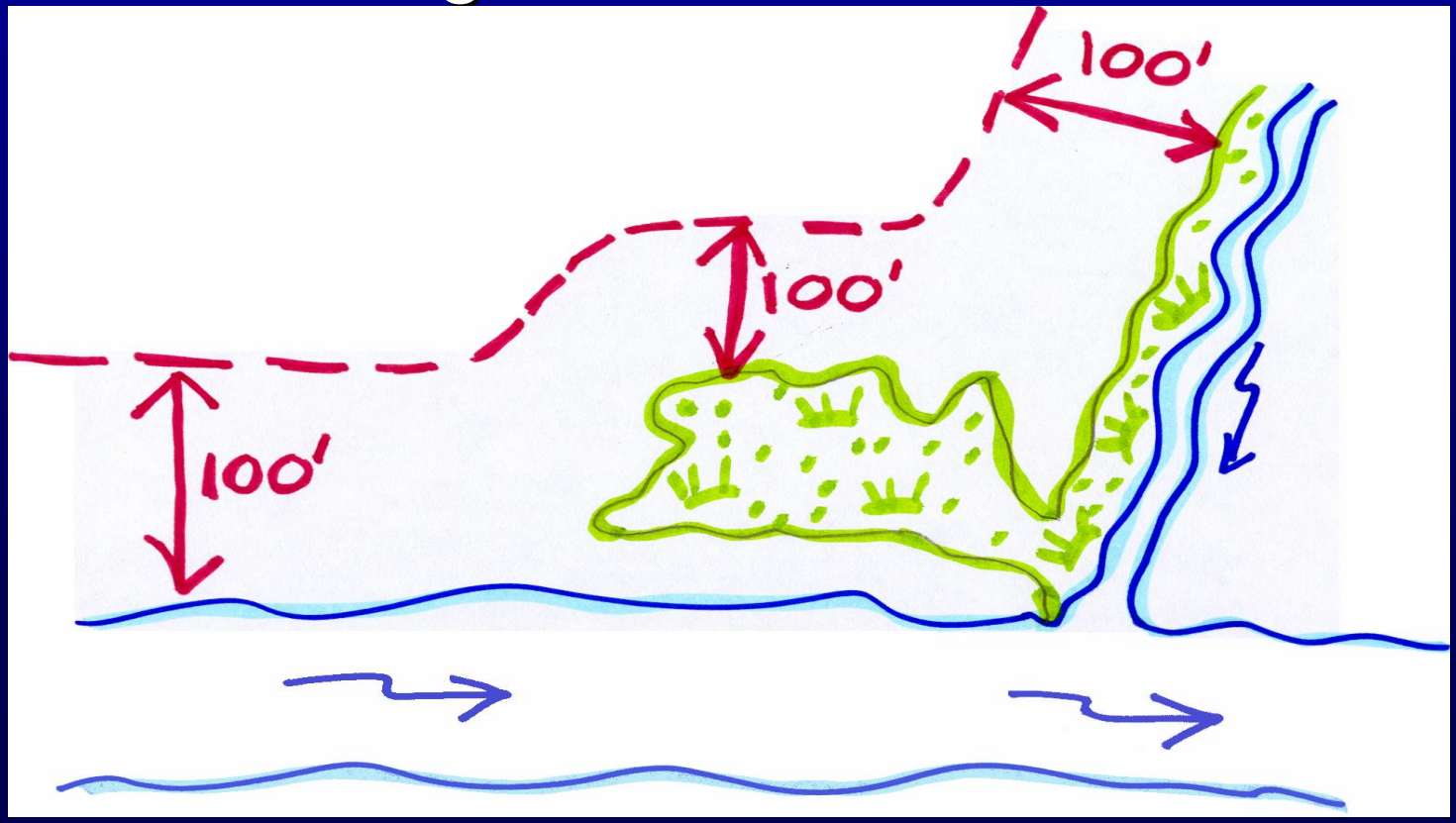
Contiguous and Connected

1. Wetlands truly isolated in the floodplain. 100-ft buffer measured from stream and not the wetland.



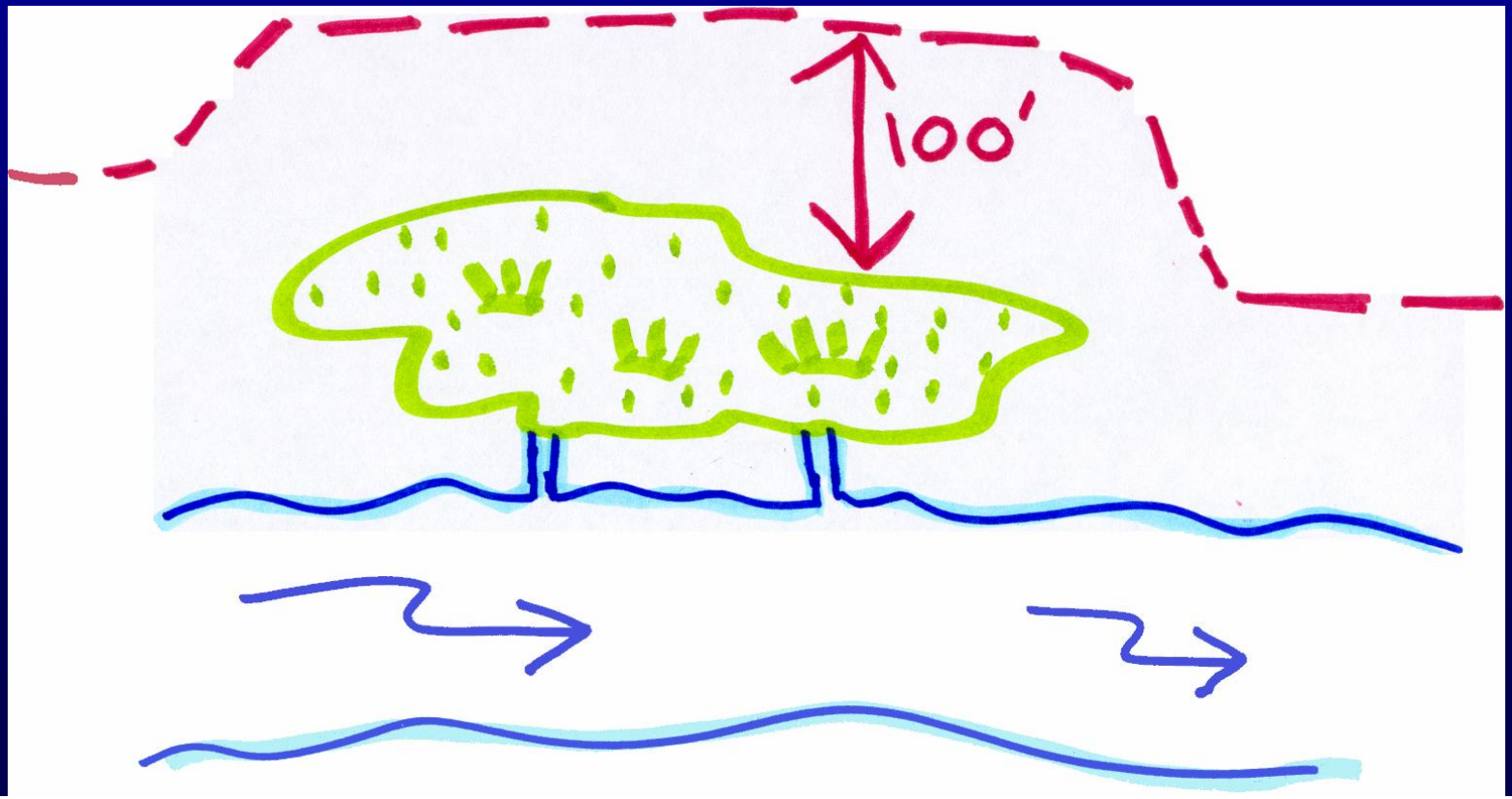
Contiguous and Connected

2. Riparian wetlands separated by a natural levee/berm and connected downstream to a perennial stream. These would be an RPA feature. 100-ft buffer is measured from the landward edge of the wetlands.



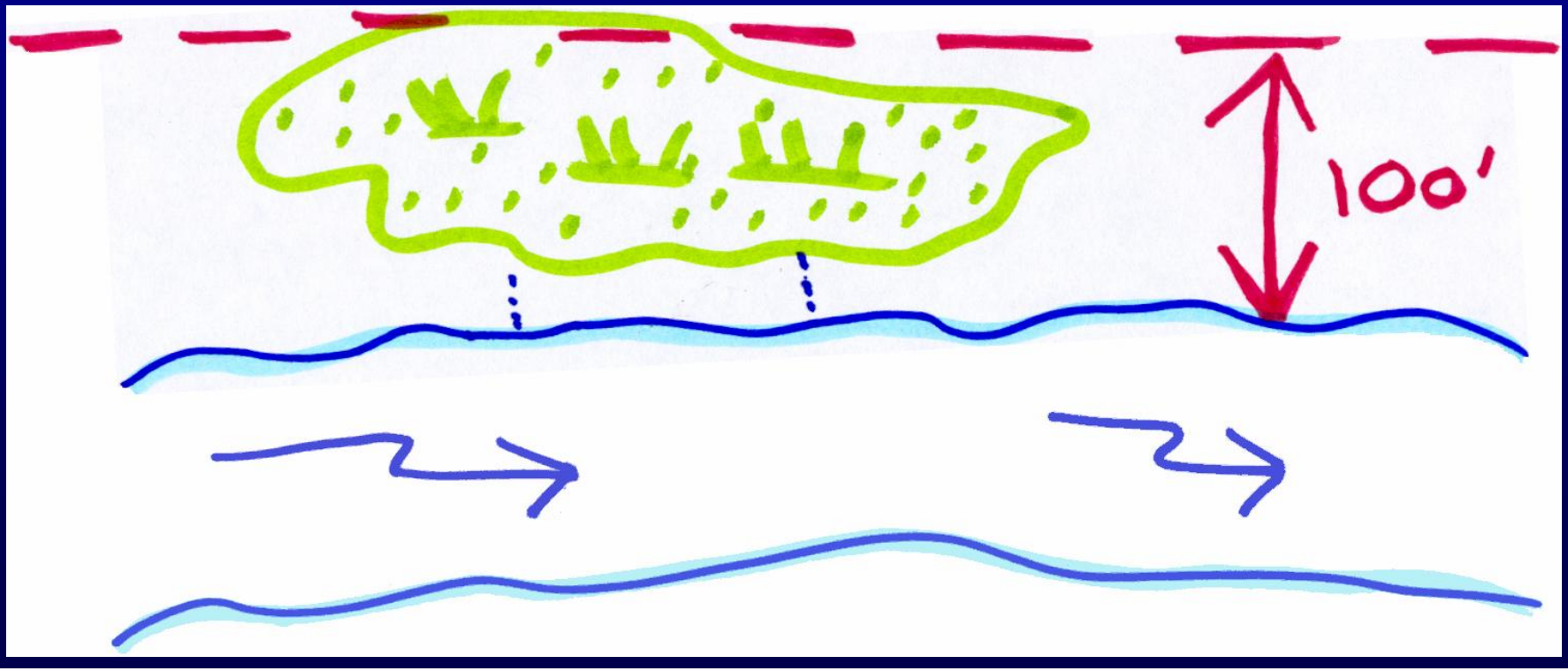
Contiguous and Connected

3. Wetlands in floodplain connected to adjacent/nearby perennial stream via a cut through the natural stream levee/berm and the cut conveys perennial flow. These are RPA wetlands and should be buffered.



Contiguous and Connected

4. Riparian wetlands connected to adjacent perennial stream via cut through the levee/berm and the cut does not convey perennial flow. These are not RPA wetlands and not required to be buffered.



QUESTIONS????

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